H0988

0055044

Date: 21 November 2000
To: Bechtel Hanford, Inc. (technical representative)
From: TechLaw, Inc.
Project: 100H Areas - Full Protocol - Waste Site 116-H-7 Overburden
Subject: Radiochemistry - Data Package No. H0988-TR (SDG No. H0988)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0988-TR which was prepared by ThermoRetec (TR). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B101W6	8/23/00	Soil	C	See note 1
B101W7	8/23/00	Soil	C	See note 1
B101W8	8/23/00	Soil	C	See note 1
B101W9	8/23/00	Soil	C	See note 1
B101X0	8/23/00	Soil	C	See note 1
B101X1	8/23/00	Soil	C	See note 1
B101X2	8/23/00	Soil	C	See note 1
B101X3	8/23/00	Soil	C	See note 1
B101X4	8/23/00	Soil	C	See note 1

1 - Gamma spectroscopy; total strontium; alpha spectroscopy; nickel-63; technetium-99.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL May 1998). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Data Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times**

  Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

  All holding times were acceptable.

- **Preparation (Method) Blanks**

  Laboratory Blanks

  Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the minimum detectable activity (MDA), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

  All blank results were acceptable.

  Field Blank

  No field blanks were submitted with the SDG, therefore, no field blank data was present for review.

- **Accuracy**

  Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS and matrix spike (MS) recovery range is either 70-130% or ±3 sigma. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30% or ±3 sigma, tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

All accuracy results were acceptable.

- **Laboratory Duplicates**

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the contract required detection limit (CRDL) and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

Field Duplicate

One set of field duplicates (B101W9/B101X0) was submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels for undetected analytes are compared against the 100 Area Remedial Action Sampling and Analysis Plan target detection limits (TDLs) to ensure that laboratory detection levels meet the required criteria. The following analytes were reported above their TDL: Uranium-235(alpha) and uranium-238(gea) in all samples; europium-155 in all samples; uranium-235(gea) in samples B101X4, B101X2, B101X1, B101W9 and B101W7; americium-241 in samples B101X4, B101X2, B101X1, B101W9, B101W7, europium-152 in sample B101X2; and europium-154 in samples B101X2, B101X1, B101W8, B101W7 and B101W9. Under the BHI statement of work, no qualification is required. All other reported laboratory MDAs were at or below the analyte-specific TDL or contract specified MDA.

- **Completeness**

Data package No. H0988-TR (SDG No. H0988) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following analytes were reported above their TDL: Uranium-235(alpha) and uranium-238(gea) in all samples; europium-155 in all samples; uranium-235(gea) in samples B101X4, B101X2, B101X1, B101W9 and B101W7; americium-241 in samples B101X4, B101X2, B101X1, B101W9, B101W7, europium-152 in sample B101X2; and europium-154 in samples B101X2, B101X1, B101W8, B101W7 and B101W9. Under the BHI statement of work, no qualification is required. All other reported laboratory MDAs were at or below the analyte-specific TDL or contract specified MDA.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 1, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, May 1998.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.

UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H0988	REVIEWER: TLI	DATE: 11/21/00	PAGE 1 OF 1
COMMENTS: No qualifiers assigned.			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (PCi/G) Page__1 of__1

Project: BECHTEL-HANFORD																					
Laboratory: TR																					
Case	SDG: H0988																				
Sample Number		B101W6		B101W7		B101W8		B101W9		B101X0		B101X1		B101X2		B101X3		B101X4			
Remarks										Duplicate											
Sample Date		8/23/00		8/23/00		8/23/00		8/23/00		8/23/00		8/23/00		8/23/00		8/23/00		8/23/00			
Radiochemistry	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q		
Nickel-63		0.955	U	0.540	U	-0.279	U	-0.080	U	0.744	U	0.595	U	-0.694	U	1.04	U	0.390	U		
Strontium (total)	1	-0.074	U	-0.042	U	-0.046	U	-0.015	U	0.006	U	-0.084	U	-0.037	U	0.028	U	-0.027	U		
Technetium-99		0.023	U	0.026	U	-0.090	U	-0.154	U	-0.130	U	0.178	U	-0.370	U	-0.130	U	0.081	U		
Uranium-233	0.1	0.466		0.363		0.328		0.371		0.342		0.373		0.499		0.492		0.384			
Uranium-235	0.1	0	U	0	U	0.017	U	0.017	U	0.038	U	0.017	U	0.050	U	0.034	U	0.069	U		
Uranium-239	0.1	0.376		0.363		0.328		0.357		0.357		0.574		0.541		0.534		0.540			
Plutonium-238	0.1	0.005	U	-0.003	U	0.003	U	-0.014	U	0.031	U	0.005	U	0.003	U	0.004	U	0.007	U		
Plutonium-239/40	0.1	0.008	U	-0.003	U	-0.003	U	-0.007	U	0	U	0.008	U	-0.006	U	0	U	0.003	U		
Potassium-40		14.4		14.5		15.5		11.4		13.5		14.0		13.4		14.1		14.4			
Cobalt 60	0.05	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U		
Cesium 137	0.05	U	U	U	U	U	U	U	U	U	U	0.069		0.121		0.067		0.102			
Radium-226		0.401		0.492		0.422		0.387		0.414		0.491		0.529		0.480		0.536			
Radium-228		0.660		0.606		0.724		0.580		0.647		0.849		0.709		0.729		0.855			
Europium 152	0.1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U		
Europium 154	0.1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U		
Europium 155	0.05	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U		
Thorium-228		0.594		0.567		0.587		0.619		0.521		0.720		0.735		0.655		0.665			
Thorium-232		0.660		0.606		0.724		0.580		0.647		0.849		0.709		0.729		0.855			
Uranium-235 (GEA)	0.1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U		
Uranium-238 (GEA)	0.1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U		
Americium-241 (GEA)	0.1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U		

000040

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize potential miss-interpretation of results. All other qualifiers shown were applied during validation.

TMA / RICHMOND

SAMPLE DELIVERY GROUP H0988

R008191-01

B101W6

DATA SHEET

SDG	7468	Client/Case no	Hanford SDG H0988
Contact	Melissa C. Mannion	Contract	TRC-SBB-207925
Lab sample id	R008191-01	Client sample id	B101W6
Dept sample id	7468-001	Location/Matrix	100H-7 Overburden SOLID
Received	08/25/00	Collected	08/23/00 08:30
% solids	99.1	Custody/SAF No	B99-042-92 B99-042

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Nickel 63	13981-37-8	0.955	1.4	2.4	30	U	NI_L
Total Strontium	SR-RAD	-0.074	0.12	0.17	1.0	U	SR
Technetium 99	14133-76-7	0.023	0.16	0.44	20	U	TC
Uranium 233	U-233/234	0.466	0.18	0.14	1.0	J	U
Uranium 235	15117-96-1	0	0.043	0.17	1.0	U	U
Uranium 238	U-238	0.376	0.18	0.14	1.0	J	U
Plutonium 238	13981-16-3	0.005	0.021	0.037	1.0	U	PU
Plutonium 239/240	PU-239/240	0.008	0.010	0.020	1.0	U	PU
Potassium 40	13966-00-2	14.4	0.57	0.20			GAM
Cobalt 60	10198-40-0	U		0.027	0.050	U	GAM
Cesium 137	10045-97-3	U		0.025	0.10	U	GAM
Radium 226	13982-63-3	0.401	0.050	0.049	0.10		GAM
Radium 228	15262-20-1	0.660	0.10	0.097	0.20		GAM
Europium 152	14683-23-9	U		0.062	0.10	U	GAM
Europium 154	15585-10-1	U		0.087	0.10	U	GAM
Europium 155	14391-16-3	U		0.066	0.10	U	GAM
Thorium 228	14274-82-9	0.594	0.030	0.028			GAM
Thorium 232	TH-232	0.660	0.10	0.097			GAM
Uranium 235	15117-96-1	U		0.10		U	GAM
Uranium 238	U-238	U		2.9		U	GAM
Americium 241	14596-10-2	U		0.077		U	GAM

100 H Area - Full Protocol

11/20/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	09/23/00

DATA SHEETS
Page 1
SUMMARY DATA SECTION
Page 12

TMA / RICHMOND

SAMPLE DELIVERY GROUP H0988

R008191-02 B101W7

DATA SHEET

SDG 7468	Client/Case no Hanford	SDG H0988	
Contact Melissa C. Mannion	Contract TRC-SBB-207925		
Lab sample id R008191-02	Client sample id B101W7		
Dept sample id 7468-002	Location/Matrix 100H-7 Overburden	SOLID	
Received 08/25/00	Collected 08/23/00 08:45		
% solids 99.4	Custody/SAF No B99-042-92	B99-042	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Nickel 63	13981-37-8	0.540	1.4	2.3	30	U	NI_L
Total Strontium	SR-RAD	-0.042	0.11	0.16	1.0	U	SR
Technetium 99	14133-76-7	0.026	0.15	0.41	20	U	TC
Uranium 233	U-233/234	0.363	0.19	0.18	1.0	J	U
Uranium 235	15117-96-1	0	0.046	0.18	1.0	U	U
Uranium 238	U-238	0.363	0.16	0.15	1.0	J	U
Plutonium 238	13981-16-3	-0.003	0.017	0.040	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.003	0.011	0.030	1.0	U	PU
Potassium 40	13966-00-2	14.5	0.78	0.37			GAM
Cobalt 60	10198-40-0	U		0.034	0.050	U	GAM
Cesium 137	10045-97-3	U		0.032	0.10	U	GAM
Radium 226	13982-63-3	0.492	0.055	0.049	0.10		GAM
Radium 228	15262-20-1	0.606	0.15	0.15	0.20		GAM
Europium 152	14683-23-9	U		0.078	0.10	U	GAM
Europium 154	15585-10-1	U		0.11	0.10	U	GAM
Europium 155	14391-16-3	U		0.098	0.10	U	GAM
Thorium 228	14274-82-9	0.567	0.042	0.043			GAM
Thorium 232	TH-232	0.606	0.15	0.15			GAM
Uranium 235	15117-96-1	U		0.14		U	GAM
Uranium 238	U-238	U		3.9		U	GAM
Americium 241	14596-10-2	U		0.26		U	GAM

100 H Area - Full Protocol

11/20/00

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 09/23/00

DATA SHEETS
Page 2
SUMMARY DATA SECTION
Page 13

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0988

R006191-03 B101W8

DATA SHEET

SDG	7468	Client/Case no	Hanford	SDG	H0988
Contact	Melissa C. Mannion	Contract	TRC-SBB-207925		
Lab sample id	R006191-03	Client sample id	B101W8		
Dept sample id	7468-003	Location/Matrix	100H-7 Overburden		SOLID
Received	08/25/00	Collected	08/23/00 09:04		
% solids	99.5	Custody/SAF No	B99-042-9B	B99-042	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Nickel 63	13981-37-8	-0.279	1.4	2.4	30	U	NI_L
Total Strontium	SR-RAD	-0.046	0.13	0.17	1.0	U	SR
Technetium 99	14133-76-7	-0.090	0.18	0.45	20	U	TC
Uranium 233	U-233/234	0.328	0.14	0.10	1.0	J	U
Uranium 235	15117-96-1	0.017	0.033	0.13	1.0	U	U
Uranium 238	U-238	0.328	0.14	0.10	1.0	J	U
Plutonium 238	13981-16-3	0.003	0.017	0.031	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.003	0.006	0.022	1.0	U	PU
Potassium 40	13966-00-2	15.5	0.87	0.31			GAM
Cobalt 60	10198-40-0	U		0.031	0.050	U	GAM
Cesium 137	10045-97-3	U		0.030	0.10	U	GAM
Radium 226	13982-63-3	0.422	0.058	0.057	0.10		GAM
Radium 228	15262-20-1	0.724	0.12	0.12	0.20		GAM
Europium 152	14683-23-9	U		0.071	0.10	U	GAM
Europium 154	15585-10-1	U		0.12	0.10	U	GAM
Europium 155	14391-16-3	U		0.063	0.10	U	GAM
Thorium 228	14274-82-9	0.587	0.036	0.032			GAM
Thorium 232	TH-232	0.724	0.12	0.12			GAM
Uranium 235	15117-96-1	U		0.10		U	GAM
Uranium 238	U-238	U		3.9		U	GAM
Americium 241	14596-10-2	U		0.042		U	GAM

100 H Area - Pull Protocol

11/24/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	09/23/00

DATA SHEETS
Page 3
SUMMARY DATA SECTION
Page 14

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0988

R008191-04 B101W9

DATA SHEET

SDG	7468	Client/Case no	Hanford SDG H0988
Contact	Melissa C. Mannion	Contract	TRC-SBB-207925
Lab sample id	R008191-04	Client sample id	B101W9
Dept sample id	7468-004	Location/Matrix	100H-7 Overburden SOLID
Received	08/25/00	Collected	08/23/00 09:19
% solids	92.4	Custody/SAF No	B99-042-92 B99-042

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Nickel 63	13981-37-8	-0.080	1.4	2.4	30	U	NI_L
Total Strontium	SR-RAD	-0.015	0.12	0.17	1.0	U	SR
Technetium 99	14133-76-7	-0.154	0.15	0.48	20	U	TC
Uranium 233	U-233/234	0.371	0.15	0.11	1.0	J	U
Uranium 235	15117-96-1	0.017	0.035	0.13	1.0	U	U
Uranium 238	U-238	0.357	0.15	0.11	1.0	J	U
Plutonium 238	13981-16-3	-0.014	0.027	0.060	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.007	0.020	0.045	1.0	U	PU
Potassium 40	13966-00-2	11.4	0.91	0.50			GAM
Cobalt 60	10198-40-0	U		0.042	0.050	U	GAM
Cesium 137	10045-97-3	U		0.040	0.10	U	GAM
Radium 226	13982-63-3	0.387	0.085	0.086	0.10		GAM
Radium 228	15262-20-1	0.580	0.14	0.15	0.20		GAM
Europium 152	14683-23-9	U		0.10	0.10	U	GAM
Europium 154	15585-10-1	U		0.15	0.10	U	GAM
Europium 155	14391-16-3	U		0.10	0.10	U	GAM
Thorium 228	14274-82-9	0.619	0.072	0.071			GAM
Thorium 232	TH-232	0.580	0.14	0.15			GAM
Uranium 235	15117-96-1	U		0.16		U	GAM
Uranium 238	U-238	U		5.5		U	GAM
Americium 241	14596-10-2	U		0.15		U	GAM

100 H Area - Full Protocol

11/24/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	2.06
Report date	09/23/00

TMA / RICHMOND

SAMPLE DELIVERY GROUP H0988

R008191-05 **B101X0**

DATA SHEET

SDG	7468	Client/Case no	Hanford SDG H0988
Contact	Melissa C. Mannion	Contract	TRC-SBB-207925
Lab sample id	R008191-05	Client sample id	B101X0
Dept sample id	7468-005	Location/Matrix	100H-7 Overburden SOLID
Received	08/25/00	Collected	08/23/00 09:19
% solids	99.4	Custody/SAF No	B99-042-92 B99-042

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Nickel 63	13981-37-8	0.744	1.4	2.3	30	U	NI_L
Total Strontium	SR-RAD	0.006	0.12	0.16	1.0	U	SR
Technetium 99	14133-76-7	-0.130	0.26	0.62	20	U	TC
Uranium 233	U-233/234	0.342	0.16	0.12	1.0	J	U
Uranium 235	15117-96-1	0.038	0.038	0.14	1.0	U	U
Uranium 238	U-238	0.357	0.16	0.12	1.0	J	U
Plutonium 238	13981-16-3	0.031	0.050	0.084	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.019	0.038	1.0	U	PU
Potassium 40	13966-00-2	13.5	0.57	0.23			GAM
Cobalt 60	10198-40-0	U		0.027	0.050	U	GAM
Cesium 137	10045-97-3	U		0.038	0.10	U	GAM
Radium 226	13982-63-3	0.414	0.046	0.045	0.10		GAM
Radium 228	15262-20-1	0.647	0.11	0.11	0.20		GAM
Europium 152	14683-23-9	U		0.060	0.10	U	GAM
Europium 154	15585-10-1	U		0.092	0.10	U	GAM
Europium 155	14391-16-3	U		0.062	0.10	U	GAM
Thorium 228	14274-82-9	0.521	0.029	0.028			GAM
Thorium 232	TH-232	0.647	0.11	0.11			GAM
Uranium 235	15117-96-1	U		0.10		U	GAM
Uranium 238	U-238	U		2.8		U	GAM
Americium 241	14596-10-2	U		0.076		U	GAM

100 H Area - Full Protocol

11/20/00

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 09/23/00

TMA / RICHMOND
SAMPLE DELIVERY GROUP R0988

R008191-06

B101X1

DATA SHEET

SDG	7468	Client/Case no	Hanford SDG R0988
Contact	Melissa C. Mannion	Contract	TRC-SBB-207925
Lab sample id	R008191-06	Client sample id	B101X1
Dept sample id	7468-006	Location/Matrix	100H-7 Overburden SOLID
Received	08/25/00	Collected	08/23/00 09:45
% solids	99.1	Custody/SAF No	B99-042-92 B99-042

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Nickel 63	13981-37-8	0.595	1.5	2.5	30	U	NI_L
Total Strontium	SR-RAD	-0.084	0.11	0.26	1.0	U	SR
Technetium 99	14133-76-7	0.178	0.27	0.71	20	U	TC
Uranium 233	U-233/234	0.373	0.15	0.11	1.0	J	U
Uranium 235	15117-96-1	0.017	0.035	0.13	1.0	U	U
Uranium 238	U-238	0.574	0.18	0.11	1.0	J	U
Plutonium 238	13981-16-3	0.005	0.016	0.029	1.0	U	PU
Plutonium 239/240	PU-239/240	0.008	0.016	0.025	1.0	U	PU
Potassium 40	13966-00-2	14.0	0.78	0.41			GAM
Cobalt 60	10198-40-0	U		0.037	0.050	U	GAM
Cesium 137	10045-97-3	0.069	0.036	0.040	0.10	J	GAM
Radium 226	13982-63-3	0.491	0.067	0.064	0.10		GAM
Radium 228	15262-20-1	0.849	0.18	0.16	0.20		GAM
Europium 152	14683-23-9	U		0.094	0.10	U	GAM
Europium 154	15585-10-1	U		0.11	0.10	U	GAM
Europium 155	14391-16-3	U		0.11	0.10	U	GAM
Thorium 228	14274-82-9	0.720	0.046	0.045			GAM
Thorium 232	TH-232	0.849	0.18	0.16			GAM
Uranium 235	15117-96-1	U		0.15		U	GAM
Uranium 238	U-238	U		4.2		U	GAM
Americium 241	14596-10-2	U		0.28		U	GAM

100 H Area - Full Protocol

11/20/00

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 09/23/00

TMA/RICHMOND
SAMPLE DELIVERY GROUP H0988

R0008191-07

B101X2

DATA SHEET

SDG 7468 Client/Case no Hanford SDG H0988
Contact Melissa C. Mannion Contract TRC-SBB-207925

Lab sample id R0008191-07 Client sample id B101X2
Dept sample id 7468-007 Location/Matrix 100H-7 Overburden SOLID
Received 08/25/00 Collected 08/23/00 10:05
% solids 99.3 Custody/SAF No B99-042-92 B99-042

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Nickel 63	13981-37-8	-0.694	1.4	2.4	30	U	NI_L
Total Strontium	SR-RAD	-0.037	0.13	0.17	1.0	U	SR
Technetium 99	14133-76-7	-0.370	0.56	0.52	20	U	TC
Uranium 233	U-233/234	0.499	0.17	0.11	1.0	J	U
Uranium 235	15117-96-1	0.050	0.067	0.13	1.0	U	U
Uranium 238	U-238	0.541	0.17	0.11	1.0	J	U
Plutonium 238	13981-16-3	0.003	0.012	0.024	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.006	0.006	0.030	1.0	U	PU
Potassium 40	13966-00-2	13.4	0.87	0.47			GAM
Cobalt 60	10198-40-0	U		0.044	0.050	U	GAM
Cesium 137	10045-97-3	0.121	0.042	0.044	0.10		GAM
Radium 226	13982-63-3	0.529	0.084	0.082	0.10		GAM
Radium 228	15262-20-1	0.709	0.17	0.17	0.20		GAM
Europium 152	14683-23-9	U		0.11	0.10	U	GAM
Europium 154	15585-10-1	U		0.14	0.10	U	GAM
Europium 155	14391-16-3	U		0.10	0.10	U	GAM
Thorium 228	14274-82-9	0.735	0.051	0.052			GAM
Thorium 232	TH-232	0.709	0.17	0.17			GAM
Uranium 235	15117-96-1	U		0.16		U	GAM
Uranium 238	U-238	U		5.4		U	GAM
Americium 241	14596-10-2	U		0.16		U	GAM

100 H Area - Full Protocol

11/20/00

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 09/23/00

DATA SHEETS
Page 7
SUMMARY DATA SECTION
Page 18

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0988

R008191-08 B101X3

DATA SHEET

SDG	7468	Client/Case no	Hanford SDG H0988
Contact	Melissa C. Mannion	Contract	TRC-SBB-207825
Lab sample id	R008191-08	Client sample id	B101X3
Dept sample id	7468-008	Location/Matrix	100H-7 Overburden SOLID
Received	08/25/00	Collected	08/23/00 10:22
% solids	99.3	Custody/SAF No	B99-042-92 B99-042

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Nickel 63	13981-37-8	1.04	1.4	2.4	30	U	NI_L
Total Strontium	SR-RAD	0.028	0.13	0.17	1.0	U	SR
Technetium 99	14133-76-7	-0.130	0.21	0.62	20	U	TC
Uranium 233	U-233/234	0.492	0.17	0.11	1.0	J	U
Uranium 235	15117-96-1	0.034	0.034	0.13	1.0	U	U
Uranium 238	U-238	0.534	0.17	0.11	1.0	J	U
Plutonium 238	13981-16-3	0.004	0.007	0.027	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.007	0.027	1.0	U	PU
Potassium 40	13966-00-2	14.1	0.53	0.19			GAM
Cobalt 60	10198-40-0	U		0.025	0.050	U	GAM
Cesium 137	10045-97-3	0.067	0.025	0.026	0.10	J	GAM
Radium 226	13982-63-3	0.480	0.051	0.048	0.10		GAM
Radium 228	15262-20-1	0.729	0.10	0.099	0.20		GAM
Europium 152	14683-23-9	U		0.062	0.10	U	GAM
Europium 154	15585-10-1	U		0.086	0.10	U	GAM
Europium 155	14391-16-3	U		0.063	0.10	U	GAM
Thorium 228	14274-82-9	0.655	0.030	0.028			GAM
Thorium 232	TH-232	0.729	0.10	0.099			GAM
Uranium 235	15117-96-1	U		0.097		U	GAM
Uranium 238	U-238	U		3.0		U	GAM
Americium 241	14596-10-2	U		0.075		U	GAM

100 H Area - Full Protocol

11/20/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	2.06
Report date	09/23/00

DATA SHEETS
Page 8
SUMMARY DATA SECTION
Page 19

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0988

R008191-09

DATA SHEET

B101X4

SDG	7468	Client/Case no	Hanford SDG H0988
Contact	Melissa C. Marnion	Contract	TRC-SBB-207925
Lab sample id	R008191-09	Client sample id	B101X4
Dept sample id	7468-009	Location/Matrix	100H-7 Overburden SOLID
Received	08/25/00	Collected	08/23/00 10:48
% solids	99.5	Custody/SAF No	B99-042-92 B99-042

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Nickel 63	13981-37-8	0.390	1.4	2.4	30	U	NI_L
Total Strontium	SR-RAD	-0.027	0.14	0.18	1.0	U	SR
Technetium 99	14133-76-7	0.081	0.35	0.65	20	U	TC
Uranium 233	U-233/234	0.384	0.15	0.11	1.0	J	U
Uranium 235	15117-96-1	0.069	0.069	0.13	1.0	U	U
Uranium 238	U-238	0.540	0.18	0.11	1.0	J	U
Plutonium 238	13981-16-3	0.007	0.007	0.025	1.0	U	PU
Plutonium 239/240	PU-239/240	0.003	0.013	0.032	1.0	U	PU
Potassium 40	13966-00-2	14.4	0.69	0.29			GAM
Cobalt 60	10198-40-0	U		0.033	0.050	U	GAM
Cesium 137	10045-97-3	0.102	0.033	0.036	0.10		GAM
Radium 226	13982-63-3	0.536	0.064	0.063	0.10		GAM
Radium 228	15262-20-1	0.855	0.16	0.14	0.20		GAM
Europium 152	14683-23-9	U		0.084	0.10	U	GAM
Europium 154	15585-10-1	U		0.10	0.10	U	GAM
Europium 155	14391-16-3	U		0.10	0.10	U	GAM
Thorium 228	14274-82-9	0.665	0.041	0.041			GAM
Thorium 232	TH-232	0.855	0.16	0.14			GAM
Uranium 235	15117-96-1	U		0.14		U	GAM
Uranium 238	U-238	U		3.9		U	GAM
Americium 241	14596-10-2	U		0.24		U	GAM

100 H Area - Full Protocol

11/20/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	09/23/00

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

ThermoRetec Nuclear Services
2030 Wright Avenue
P.O. Box 4040
Richmond, CA 94804

ThermoRetec
Smart Solutions. Positive Outcomes.

(800) 841-5487 Phone
(510) 235-2633 Phone
(510) 235-0438 Fax
www.thermoretec.com

September 25, 2000

Ms. Joan Kessner
Bechtel Hanford Inc.
3190 George Washington Way
Richland, WA 99352
MSIN: H9-03

Reference: **P.O. #TRC-SBB-207925**
Thermo Retec R0-08-191-7468, SDG H0988

Dear Ms. Kessner:

Enclosed is the data report for nine solid samples designated under SAF No. B99-042 received at Thermo Retec on August 25, 2000. The samples were analyzed according to the accompanying chain-of-custody documents.

Please call if you have any questions concerning this report.

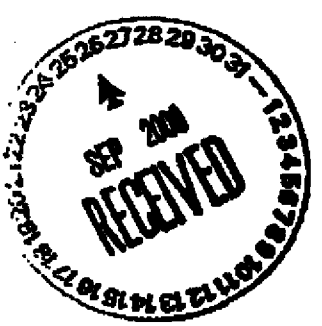
Sincerely,

Melissa Mannion

Melissa C. Mannion
Program Manager

MCM/sm

Enclosure: Data Package



Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-042-92	Page 1 of 1
Collector: Johnsen/Buechler	Company Contact: Mike Stankovich; Telephone No. 531-7620	Project Coordinator: TRENT, SJ	Price Code 8L; Data Turnaround 21 Days
Project Designation: 100 H Area - Full Protocol	Sampling Location: 100H-7 Overburden H0988 (7468)	SAF No. B99-042	Air Quality ☐
Ice Chest No. IAZ (3)	Field Logbook No. EL-1500-3; COA R116H72600	Method of Shipment: Federal Express	
Shipped To: TMA/RECRA TMA	Offsite Property No. HMSR 000852	Bill of Lading/Air Bill No. N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS
PCB'S-Data review & process knowledge indicate PCB content <50ppm

Special Handling and/or Storage

Preservation	None	None	Cool 4C	Cool 4C	None	None
Type of Container	aG	aG	aG	aG	aG	P
No. of Container(s)	(1)	(1)	1	1	1	(2)
Volume	60mL	60mL	125mL	250mL	250mL	500mL
SAMPLE ANALYSIS	Isotopic Plutonium; Isotopic Uranium	Strontium-89,90 -- Total Sr; Nickel-63; Technetium-99	Chromium Hex; 7196 (TMA 8-23-00)	PCBs-8081 (TMA 8-23-00)	See Item (1) in Special Instructions. (TMA 8-23-00)	See Item (2) in Special Instructions.

Sample No.	Matrix *	Sample Date	Sample Time							Tie ID
B101X1	SOIL	08-23-00	0945	X	X				X	BOX K81
B101X2	SOIL	08-23-00	1005	X	X				X	
B101X3	SOIL	08-23-00	1022	X	X				X	
B101X4	SOIL	08-23-00	1048	X	X				X	

CHAIN OF POSSESSION	Date/Time	Sign/Print Names	Date/Time
Relinquished By: Mathers/Mathers	8-23-00 1525	Received By: R. Thoren / R. Thoren	8-23-00 1525
Relinquished By: Stored in Ref 1B / R. Thoren	8-23-00 1600	Received By: Stored in Ref 1B 3728	8-23-00 1600
Relinquished By: Removed from Ref 1B 3728	8-24-00 0900	Received By: R. Thoren / R. Thoren	8-24-00 0900
Relinquished By: R. Thoren / R. Thoren	8-24-00 1430	Received By: FEDEX	08/24/00
Relinquished By: FedEx	08/25/00 9:45	Received By: E. Siegel	08/25/00 9:45
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS
** Samplers are to completely fill bottles for ICP Metals and Pu-Iso/U-Iso analyses to insure adequate volume is collected.
** If Am-241 or Total Hg is requested, combine with the Pu-Iso/U-Iso and ICP Metals analyses respectively.
~~(1) ICP Metals - 6010A (Supertrace) (Arsenic, Chromium, Lead), Mercury~~ RT 8-24-00
(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)

FAXED 8/25/00

Matrix *: S=Soil, SE=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/98)

OCT 31 '00 03:54PM BHI S&D MANAGEMENT 509 372 9487 P.45/46

0000022

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-042-92	Page 1 of 2

Collector Johnson/Baechler	Company Contact Mike Stankovich	Telephone No. 531-7620	Project Coordinator TRENT, SJ
Project Designation 100 H Area - Full Protocol	Sampling Location 100H-7 Overburden HO988 (7468)		SAF No. B99-042
Ice Chest No. ~~SMAL 514~~ BTS8780 212 (2)	Field Logbook No. EL-1580-3	COA R116H72600	Method of Shipment Federal Express
Shipped To TMA/RECRA TMA	Offsite Property No. HWSR 000853		Bill of Lading/Air Bill No. N/A

Price Code 8L

Air Quality ☐

Data Turnaround 21 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

PCB'S - DATA Review & Process Knowledge indicate PCB content < 50 ppm

Special Handling and/or Storage

Preservation	None	None	Cool 4C	Cool 4C	None	None				
Type of Container	aG	aG	aG	aG	aG	P				
No. of Container(s)	1	1	1	1	1	2				
Volume	60mL	60mL	125mL	250mL	250mL	500mL				
SAMPLE ANALYSIS	Isotopic Plutonium; Isotopic Uranium	Strontium-89,90 -- Total Sr; Nickel-63; Technetium-99	Chromium Hex - 7196	VOAs - 8260	See item (1) in Special Instructions.	See item (2) in Special Instructions.				Til To

Handwritten across the Cool 4C and third None columns: 8-23-00 SBD; 8-23-00 MMB; 8-23-00 MMB

Sample No.	Matrix *	Sample Date	Sample Time										
B101W6	SOIL	08-23-00	0820	X	X				X			BOX	K39
B101W7	SOIL	08-23-00	0841	X	X				X				
B101W8	SOIL	08-23-00	0904	X	X				X				
B101W9	SOIL	08-23-00	0919	X	X				X				
B101X0	SOIL	08-23-00	0919	X	X				X				

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By M. Johnson 8-23-00	Date/Time 1528	Received By R. Thoren R. Thoren 8-23-00	Date/Time 1528
Relinquished By R. Thoren R. Thoren 8-23-00	Date/Time 1600	Received By Storage in RSF 1B 8-23-00	Date/Time 1600
Relinquished By Removed from RSF 1B 8-24-00	Date/Time 0800	Received By R. Thoren R. Thoren 8-24-00	Date/Time 0800
Relinquished By R. Thoren R. Thoren 8-24-00	Date/Time 1430	Received By FED EX 08/24/00	Date/Time 9:15
Relinquished By Fed Express 08/25/00	Date/Time 9:15	Received By E. Storer	Date/Time 08/25/00
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

** Samplers are to completely fill bottles for ICP Metals and Pu-Iso/U-Iso analyses to insure adequate volume is collected.

** If Am-241 or Total Hg is requested, combine with the Pu-Iso/U-Iso and ICP Metals analyses respectively.

(1) ICP Metals - 6010A (Supertrace) {Arsenic, Chromium, Lead}; Mercury - 7471 - (CV)

(2) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

FAXED 8/23/00

Matrix *

S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

000023

OCT 31 '00 03:53PM BHI S&D MANAGEMENT 509 372 9487 P.44/46

Appendix 5

Data Validation Supporting Documentation

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 100H 116-H-7			DATA PACKAGE: H0988		
VALIDATOR: TLI		LAB: TR		DATE: 11/20/00	
CASE:			SDG: H0988		

ANALYSES PERFORMED

☐ Gross Alpha/Beta	☒ Strontium-90	☒ Technetium-99	☒ Alpha Spectroscopy	☐ Gamma Spectroscopy	
☐ Total Uranium	☐ Radium-22	☐ Tritium	☒ Pu-239		

SAMPLES/MATRIX B101W6 B101W7 B101W8 B101W9
B101X0 B101X1 B101X2 B101X3
B101X4 ~~B101X5~~ ~~B101X6~~ ~~B101X7~~
Soil

1. Completeness . . . . . ☒ N/A

Technical verification forms present? . . . . . Yes No N/A

Comments: _____

2. Initial Calibration . . . . . ☒ N/A

Instruments/detectors calibrated within one year of sample analysis? . . . . . Yes No N/A

Initial calibration acceptable? . . . . . Yes No N/A

Standards NIST traceable? . . . . . Yes No N/A

Standards Expired? . . . . . Yes No N/A

Comments: _____

3. Continuing Calibration . . . . . ☒ N/A

Calibration checked within one week of sample analysis? . . .	Yes	No	N/A
Calibration check acceptable?	Yes	No	N/A
Calibration check standards NIST traceable?	Yes	No	N/A
Calibration check standards expired?	Yes	No	N/A

Comments:_____

4. Blanks . . . . . ☐ N/A

Method blank analyzed?	(Yes)	No	N/A
Method blank results acceptable?	(Yes)	No	N/A
Analytes detected in method blank?	Yes	(No)	N/A
Field blank(s) analyzed?	Yes	(No)	N/A
Field blank results acceptable?	Yes	No	(N/A)
Analytes detected in field blank(s)?	Yes	No	(N/A)
Transcription/Calculation Errors?	Yes	No	(N/A)

Comments: No Field blank no analytes in MS

5. Matrix Spikes . . . . . ☒ N/A

Matrix spike analyzed?	Yes	No	N/A
Spike recoveries acceptable?	Yes	No	N/A
Spike source traceable?	Yes	No	N/A
Spike source expired?	Yes	No	N/A
Transcription/Calculation Errors?	Yes	No	N/A

Comments:_____

6. Laboratory Control Samples . . . . . ☐ N/A

LCS analyzed?	(Yes)	No	N/A
LCS recoveries acceptable?	(Yes)	No	N/A
LCS traceable?	Yes	No	(N/A)
Transcription/Calculation Errors?	Yes	No	(N/A)

Comments:_____

7. Chemical Recovery . . . . . ☐ N/A

Chemical carrier added?	(Yes)	No	N/A
Chemical recovery acceptable?	(Yes)	No	N/A
Chemical carrier traceable?	Yes	No	(N/A)
Chemical carrier expired?	Yes	No	(N/A)
Transcription/Calculation errors?	Yes	No	(N/A)

Comments:_____

8. Duplicates . . . . . ☐ N/A

Duplicates Analyzed?	(Yes)	No	N/A
RPD Values Acceptable?	(Yes)	No	N/A
Transcription/Calculation Errors?	Yes	No	(N/A)

Comments:_____

AS

9. Field QC Samples . . . . . ☐ N/A

Field duplicate sample(s) analyzed?	(Yes)	No	N/A
Field duplicate RPD values acceptable?	(Yes)	No	N/A
Field split sample(s) analyzed?	Yes	(No)	N/A
Field split RPD values acceptable?	Yes	No	(N/A)
Performance audit sample(s) analyzed?	Yes	(No)	N/A
Performance audit sample results acceptable?	Yes	No	(N/A)

Comments: No FS or QA analyzed

10. Holding Times

Are sample holding times acceptable?	(Yes)	No	N/A

Comments:

11. Results and Detection Limits (Levels D & E) . . . . . ☐ N/A

Results reported for all required sample analyses?	(Yes)	No	N/A
Results supported in raw data?	Yes	No	(N/A)
Results Acceptable?	(Yes)	No	N/A
Transcription/Calculation errors?	Yes	No	(N/A)
MDA's meet required detection limits?	Yes	(No)	N/A
Transcription/calculation errors?	Yes	No	(N/A)

Comments: MDA – see narrative

A-47

Appendix 6

Additional Documentation Requested by Client

TMA / RICHMOND
SAMPLE DELIVERY GROUP H0988

R008191-11 Method Blank

METHOD BLANK

SDG	7468	Client/Case no	Hanford SDG H0988
Contact	Melissa C. Mannion	Contract	TRC-SBB-207925
Lab sample id	R008191-11	Client sample id	Method Blank
Dept sample id	7468-011	Material/Matrix	SOLID
		SAF No	B99-042

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Nickel 63	13981-37-8	0.319	1.3	2.2	30	U	NI_L
Total Strontium	SR-RAD	-0.059	0.11	0.15	1.0	U	SR
Technetium 99	14133-76-7	-0.100	0.14	0.43	20	U	TC
Uranium 233	U-233/234	0.015	0.015	0.024	1.0	U	U
Uranium 235	15117-96-1	0.006	0.012	0.024	1.0	U	U
Uranium 238	U-238	-0.003	0.005	0.019	1.0	U	U
Plutonium 238	13981-16-3	0.017	0.020	0.033	1.0	U	PU
Plutonium 239/240	PU-239/240	0.002	0.010	0.024	1.0	U	PU
Potassium 40	13966-00-2	U		0.092		U	GAM
Cobalt 60	10198-40-0	U		0.009	0.050	U	GAM
Cesium 137	10045-97-3	U		0.010	0.10	U	GAM
Radium 226	13982-63-3	U		0.024	0.10	U	GAM
Radium 228	15262-20-1	U		0.034	0.20	U	GAM
Europium 152	14683-23-9	U		0.021	0.10	U	GAM
Europium 154	15585-10-1	U		0.027	0.10	U	GAM
Europium 155	14391-16-3	U		0.018	0.10	U	GAM
Thorium 228	14274-82-9	U		0.013		U	GAM
Thorium 232	TH-232	U		0.034		U	GAM
Uranium 235	15117-96-1	U		0.025		U	GAM
Uranium 238	U-238	U		0.91		U	GAM
Americium 241	14596-10-2	U		0.025		U	GAM

100 H Area - Full Protocol

QC-BLANK 35655

Lab id	TMARC
Protocol	Hanford
Version	Ver 1.0
Form	DVP-DS
Version	3.06
Report date	09/23/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP R0988

R0008191-10 Lab Control Sample

LAB CONTROL SAMPLE

SDG 7458 Client/Case no Hanford SDG R0988

Contact Melissa C. Mannion Case no TRC-6RR-207925

Lab sample id R0008191-10 Client sample id Lab Control Sample

Dept sample id 7458-010 Material/Matrix SOLID

SAF No RRR-042

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LIMS (TOTAL)	PROTOCOL LIMITS
Nickel 63	144	3.8	2.2	30		NI_L	146	5.8	99	84-116	80-120
Total Strontium	12.8	0.89	0.21	1.0		SR	13.2	0.49	106	82-118	80-120
Technetium 99	54.7	1.9	0.72	20		TC	56.7	2.3	96	84-116	80-120
Uranium 233	8.92	1.3	0.69	1.0		U	9.66	0.39	92	78-122	80-120
Uranium 235	7.77	1.2	0.20	1.0		U	7.84	0.31	99	76-124	80-120
Uranium 238	10.1	1.4	0.61	1.0		U	10.5	0.42	96	78-122	80-120
Plutonium 238	10.6	0.57	0.031	1.0		PU	11.2	0.45	95	88-112	80-120
Plutonium 239/240	11.4	0.61	0.036	1.0		PU	11.9	0.48	96	88-112	80-120
Cobalt 60	0.338	0.047	0.027	0.050		GAM	0.326	0.013	104	68-132	80-120
Cesium 137	0.418	0.040	0.026	0.10		GAM	0.371	0.015	113	69-131	80-120

100 H Area - Full Protocol

QC-LCS 26554

Lab id TMRC
Protocol Hanford
Version Var 1.0
Form DVT-LCS
Version 3.06
Report date 08/23/00

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0988

R0000191-12 B101N6

DUPLICATE

SDG 7468		Client/case no Hanford	SDG H0988
Contact Melissa C. Mannion		Case no TRC-SSD-207926	
DUPLICATE	ORIGINAL		
Lab sample id R0000191-12	Lab sample id R0000191-01	Client sample id B101N6	
Dept sample id 7468-012	Dept sample id 7468-001	Location/Matrix 100H-7 Overburden	SOLID
	Received 08/25/00	Collected 08/23/00 08:30	
% solids 89.1	% solids 88.4	Custody/SAF No B99-042-52	B99-042

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALIFIERS	RPD %	3σ PROT TOT LIMIT
Nickel 63	2.91	1.5	2.4	30	J	BT_L	0.955	1.4	2.4	U	101	161
Total Strontium	-0.019	0.056	0.13	1.0	U	SR	-0.076	0.12	0.17	U	-	
Technetium 99	0.037	0.18	0.50	30	U	TC	0.023	0.16	0.44	U	-	
Uranium 233	0.308	0.17	0.20	1.0	J	U	0.466	0.18	0.14	J	41	97
Uranium 235	0	0.050	0.19	1.0	U	U	0	0.042	0.17	U	-	
Uranium 238	0.534	0.21	0.16	1.0	J	U	0.376	0.18	0.14	J	35	90
Plutonium 238	-0.003	0.007	0.025	1.0	U	PU	0.005	0.021	0.037	U	-	
Plutonium 239/240	0.007	0.007	0.026	1.0	U	PU	0.008	0.010	0.020	U	-	
Potassium 40	15.5	0.73	0.21			GAM	14.4	0.57	0.20		7	33
Cobalt 60	U		0.026	0.050	U	GAM	U		0.027	U	-	
Cesium 137	U		0.028	0.10	U	GAM	U		0.026	U	-	
Radium 226	0.516	0.057	0.054	0.10		GAM	0.401	0.050	0.049		25	41
Radium 228	0.710	0.13	0.13	0.20		GAM	0.660	0.10	0.097		7	48
Europium 152	U		0.065	0.10	U	GAM	U		0.062	U	-	
Europium 154	U		0.089	0.10	U	GAM	U		0.087	U	-	
Europium 155	U		0.086	0.10	U	GAM	U		0.066	U	-	
Thorium 228	0.638	0.034	0.033			GAM	0.594	0.030	0.026		7	34
Thorium 232	0.710	0.13	0.13			GAM	0.660	0.10	0.097		7	48
Uranium 235	U		0.093		U	GAM	U		0.10	U	-	
Uranium 238	U		3.3		U	GAM	U		2.9	U	-	
Americium 241	U		0.036		U	GAM	U		0.077	U	-	

100 H Area - Full Protocol

QC-DUP#1 25656

Lab id TMAHC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 1.06
Report date 09/23/00

Date: 21 November 2000
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100H Areas - Full Protocol - Waste Site 116-H-7 Overburden
Subject: PCB - Data Package No. H0988-RLN (SDG No. H0988)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0988-RLN prepared by Recra LabNet (RLN). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B101W6	8/23/00	Soil	C	PCBs by 8082
B101W7	8/23/00	Soil	C	PCBs by 8082
B101W8	8/23/00	Soil	C	PCBs by 8082
B101W9	8/23/00	Soil	C	PCBs by 8082
B101X0	8/23/00	Soil	C	PCBs by 8082
B101X1	8/23/00	Soil	C	PCBs by 8082
B101X2	8/23/00	Soil	C	PCBs by 8082
B101X3	8/23/00	Soil	C	PCBs by 8082
B101X4	8/23/00	Soil	C	PCBs by 8082

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, May 1998). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times**

  Sample data were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

  If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

  All holding times were acceptable.

- **Method Blank**

  Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than target detection limit (TDL). If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than TDL, the result is qualified as undetected and elevated to the TDL.

  All method blank target compound results were acceptable.

  Field Blanks

  No field blanks were submitted for analysis, therefore, no field blank data was available for review.

- **Accuracy**

  Matrix Spike

  Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike analyses are performed in duplicate and must be within control limits of 70% to 130%. If spike recoveries are outside control limits, detected

sample results less than five times the spike concentration are qualified as estimates and flagged "J". Non-detected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to a matrix spike recovery of 68%, all PCB results (except B101X0) were qualified as estimates and flagged "J". It was noted that the matrix spike was analyzed several days after many of the samples and that would have required the qualification of multiple results even if the recovery had been acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Non-detected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Non-detected compounds with surrogate recoveries above the upper control limit require no qualification.

Due to a surrogate recovery of 17%, all PCB results in sample B101X2 were qualified as estimates and flagged "J".

Due to a surrogate recovery of 123%, the aroclor-1260 result in sample B101X3 was qualified as an estimate and flagged "J".

All other surrogate recovery results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All matrix spike/matrix spike duplicate precision results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples B101X0/B101W9) were submitted to RLN for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 Area TDLs to ensure that laboratory detection levels meet the required criteria. The reported detection limit was exceeded for all undetected aroclor-1221 results. Under the BHI statement of work, no qualification is required.

- **Completeness**

Data Package No. H0988-RLN (SDG No. H0988) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to a matrix spike recovery of 68%, all PCB results (except B101X0) were qualified as estimates and flagged "J". It was noted that the matrix spike was analyzed several days after many of the samples and that would have required the qualification of multiple results even if the recovery had been acceptable. Due to a surrogate recovery of 17%, all PCB results in sample B101X2 were qualified as estimates and flagged "J". Due to a surrogate recovery of 123%, the aroclor-1260 result in sample B101X3 was qualified as an estimate and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The reported detection limit was exceeded for all undetected aroclor-1221 results. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-35, *Sample and Analysis Plan for 105F and 105DR Phase III Below Grade Structures and Underlying Soils*.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H0988	REVIEWER: TLI	DATE: 11/21/00	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All	J/UJ	All except B101X0	Matrix spike recovery
All	J/UJ	B101X2	Surrogate recovery
Aroclor-1260	J	B101X3	Surrogate recovery

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFORD																					
Laboratory: RECRA																					
Case	SDG: H0988																				
Sample Number		B101W6		B101W7		B101W8		B101W9		B101X0		B101X1		B101X2		B101X3		B101X4			
Remarks										Duplicate											
Sample Date		8/23/00		8/23/00		8/23/00		8/23/00		8/23/00		8/23/00		8/23/00		8/23/00		8/23/00			
PCB	PQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1016	50	33	UJ	33	UJ	33	UJ	33	UJ	33	U	33	UJ	33	UJ	33	UJ	33	UJ		
Aroclor-1221	50	66	UJ	66	UJ	66	UJ	66	UJ	67	U	66	UJ	66	UJ	67	UJ	66	UJ		
Aroclor-1232	50	33	UJ	33	UJ	33	UJ	33	UJ	33	U	33	UJ	33	UJ	33	UJ	33	UJ		
Aroclor-1242	50	33	UJ	33	UJ	33	UJ	33	UJ	33	U	33	UJ	33	UJ	33	UJ	33	UJ		
Aroclor-1248	50	33	UJ	33	UJ	33	UJ	33	UJ	33	U	33	UJ	33	UJ	33	UJ	33	UJ		
Aroclor-1254	50	33	UJ	33	UJ	33	UJ	33	UJ	33	U	33	UJ	33	UJ	33	UJ	33	UJ		
Aroclor-1260	50	33	UJ	33	UJ	33	UJ	33	UJ	33	U	86	J	27	J	76	J	29	J		

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Recra LabNet - Lionville Laboratory
PCBs by GC
Report Date: 10/12/00 17:06

RFW Batch Number: 00081362 Client: TMU-HANFORD B99-042 Work Order: 10985001001 Page: 1

05

		Cust ID:	B101W6	fl	B101W7	fl	B101W7	fl	B101W7	fl	B101W8	fl	B101W9	fl
Sample Information		RFW#:	001		002		002 MS		002 MSD		003		004	
		Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
		D.F.:	1.00		1.00		1.00		1.00		1.00		1.00	
		Units:	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Surrogate:	Tetrachloro-m-xylene		98	%	105	%	95	%	90	%	85	%	102	%
	Decachlorobiphenyl		97	%	104	%	80	%	81	%	82	%	105	%
Aroclor-1016			33	U J	33	U J	33	U	33	U	33	U J	33	U J
Aroclor-1221			65	U	66	U	66	U	66	U	66	U	66	U
Aroclor-1232			33	U	33	U	33	U	33	U	33	U	33	U
Aroclor-1242			33	U	33	U	33	U	33	U	33	U	33	U
Aroclor-1248			33	U	33	U	33	U	33	U	33	U	33	U
Aroclor-1254			33	U	33	U	68	%	74	%	33	U	33	U
Aroclor-1260			33	U	33	U	33	U	33	U	33	U	33	U

		Cust ID:	B101X1	fl	B101X2	fl	B101X3	fl	B101X4	fl	PBLKYG	fl	PBLKYG BS	fl
Sample Information		RFW#:	005		006		007		008		00LE1056-MB1		00LE1056-MB1	
		Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
		D.F.:	1.00		1.00		1.00		1.00		1.00		1.00	
		Units:	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Surrogate:	Tetrachloro-m-xylene		112	%	60	%	118	%	92	%	105	%	130 *	%
	Decachlorobiphenyl		109	%	17 *	%	123 *	%	88	%	117	%	121	%
Aroclor-1016			33	U J	33	U J	33	U J	33	U J	33	U	33	U
Aroclor-1221			66	U	66	U	67	U	66	U	67	U	67	U
Aroclor-1232			33	U	33	U	33	U	33	U	33	U	33	U
Aroclor-1242			33	U	33	U	33	U	33	U	33	U	33	U
Aroclor-1248			33	U	33	U	33	U	33	U	33	U	33	U
Aroclor-1254			33	U	33	U	33	U	33	U	33	U	94	%
Aroclor-1260			85		27	J	76		29	J	33	U	33	U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

8/2/11

AW 10-13-00

000027

OCT 31 '00 03:15PM BHI S&D MANAGEMENT 509 372 9487

Recra LabNet - Lionville Laboratory

PCBs by GC

Report Date: 10/09/00 11:33

RFW Batch Number: 0009L459 Client: TNU-HANFORD B99-042 Work Order: 10985001001 Page: 1

	Cust ID:	B101X0	B101X0	B101X0	PBLKYS	PBLKYS BS
Sample Information	RFW#:	001	001 MS	001 MSD	00LK1088-MB1	00LK1088-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	95 %	88 %	95 %	95 %	98 %
	Decachlorobiphenyl	75 %	71 %	81 %	91 %	88 %
Aroclor-1016		33 U J	33 U	33 U	33 U	33 U
Aroclor-1221		67 U	66 U	66 U	67 U	67 U
Aroclor-1232		33 U	33 U	33 U	33 U	33 U
Aroclor-1242		33 U	33 U	33 U	33 U	33 U
Aroclor-1248		33 U	33 U	33 U	33 U	33 U
Aroclor-1254		33 U	75 %	83 %	33 U	86 %
Aroclor-1260		33 U	33 U	33 U	33 U	33 U

E70003

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA ENVIRONMENTAL INC.
Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU HANFORD ~~B00-042~~ B99-042 **W.O.#:** 10985-001-001-9999-00
RFW#: 0008L362/0009L459 **Date Received:** 08-25-00, 09-01-00
SDG/SAF#: H0988/~~B00-042~~ B99-042

PCB 10/16/00

The set of samples consisted of nine (9) soil samples collected on 08-23-00.

The samples and their associated QC samples were extracted on 08-29-00, 09-05-00, and analyzed according to Recra OPs based on SW846, 3rd Edition procedures on 09-14,15,20,29-00. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082 for Aroclors only.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. The cooler temperature has been recorded on the chain-of-custody.
2. All required holding times for extraction and analysis have been met.
3. The samples and their associated QC samples received a sulfuric acid cleanup. The samples from Recra batch 0008L362 received and additional sulfur cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. Three (3) of thirty-four (34) surrogate recoveries were outside QC limits; however, the surrogate recovery acceptance criteria were met (i.e., no more than one outlier per sample).
6. The blank spike recovery was within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

by _____ 10/13/00

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

Date

pc/c:\group\data\pers\009L-459.pcb

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-042-92	Page 1 of 1

Collector: Johnsen/Buechler	Company Contact: Mike Stankovich — Telephone No. 531-3620	Project Coordinator: TRENT, SJ	Price Code: 8L — Data Turnaround: 21 Days
Project Designation: 100 H Area - Full Protocol	Sampling Location: 100H-7 Overburden	SAF No. B99-042	Air Quality ☐
Ice Chest No. 1A2 (2)	Field Logbook No. EL-1500-3 — COA R116H72600	Method of Shipment: Federal Express	
Shipped To: TMA/RECRA — RECRA	Offsite Property No. HMSP 000833	Bill of Lading/Air Bill No. NA	

POSSIBLE SAMPLE HAZARDS/REMARKS
PCB'S - Data review & Process Knowledge indicate PCB content <50ppm

Special Handling and/or Storage

Preservation	None	None	Cool 4C	Cool 4C	None	None				
Type of Container	aG	aG	aG	aG	aG	P				
No. of Container(s)	1	1	1	1	1	2				
Volume	60mL	60mL	125mL	250mL	250mL	500mL				
SAMPLE ANALYSIS	[illegible]	[illegible]	Chromium Hex - 7196	PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions			TiP	JO

Sample No.	Matrix *	Sample Date	Sample Time										
B101X1	SOIL	8-23-00	0945			X	X	X				80X	K39
B101X2	SOIL	8-23-00	1005			X	X	X					
B101X3	SOIL	8-23-00	1022			X	X	X					
B101X4	SOIL	8-23-00	1048			X	X	X					

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
MM Mansen / MM Mansen	8-23-00 1525	R. Thoran / R. Thoran	8-23-00 1525
R. Thoran / R. Thoran	8-23-00 1600	Stored in Ref 1B	8-23-00 1600
Removed from Ref 1B	8-24-00 0800	R. Thoran / R. Thoran	8-24-00 0800
R. Thoran	8-24-00 1430	FedEx	
Fed Ex	8/25/00 0930	[signature]	8/25/00 0930

SPECIAL INSTRUCTIONS
** Samplers are to completely fill bottles for ICP Metals and Pu-Iso/U-Iso analyses to insure adequate volume is collected.
** If Am-241 or Total Hg is requested, combine with the Pu-Iso/U-Iso and ICP Metal's analyses respectively.

(1) ICP Metals - 6010A (Supertrace) {Arsenic, Chromium, Lead}; Mercury - 7471 - (CV)
(2) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

3305081032 Temp 5.9

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-042-92	Page 1 of 2

Collector Johnson/Beechler	Company Contact Mike Sankovich	Telephone No. 531-7620	Project Coordinator TRENT, SJ
Project Designation 100 H Area - Full Protocol	Sampling Location 100H-7 Overburden		SAF No. B99-042
Ice Chest No. 1A2 ~~SMC 519~~ (3) ZT 8-24-00	Field Logbook No. EL-1500-3	COA R116H72600	Method of Shipment Federal Express
Shipped To TMA/RECRA RECRA	Offsite Property No. HMSR G00832		Bill of Lading/Air Bill No. N/A

Price Code 8L

Air Quality ☐

Data Turnaround 21 Days

POSSIBLE SAMPLE HAZARDS/REMARKS
PCB's - process knowledge & Data review indicate PCB Content <50 ppm

Special Handling and/or Storage

Preservation	~~None~~	~~None~~	Cool 4C	Cool 4C	None	~~None~~					
Type of Container	~~aG~~	~~aG~~	aG	aG	aG	~~P~~					
No. of Container(s)	~~1~~	~~1~~	1	1	1	~~2~~					
Volume	~~60mL~~	~~60mL~~	125mL	250mL	250mL	~~500mL~~					
SAMPLE ANALYSIS	~~Isotopic Plutonium; ...~~	~~Sr-90 -- Total Sr; Ni-63; Tc-99~~	Chromium Hex - 7196	PCBs - 8082	See item (1) in Special Instructions	~~See item (2) in Special Instructions~~				Tie	To

Struck-through entries annotated: "TM 8-23-00", "TM 8-23-00", "TM 8-23-00".

Sample No.	Matrix *	Sample Date	Sample Time										
B101W6	SOIL	08-23-00	0830			X	X	X				BOX	K31
B101W7	SOIL	08-23-00	0846			X	X	X					
B101W8	SOIL	08-23-00	0904			X	X	X					
B101W9	SOIL	08-23-00	0919			X	X	X					
B101X0	SOIL	08-23-00	0919			X	X	X					

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
[signature]	8-23-00 1025	R. Thoren / R. Thoren	8-23-00 1025
R. Thoren / R. Thoren	8-23-00 1600	Stored in RCL 1R 3728	8-23-00 1600
Removed from RCL 1R 3728	8-24-00 0900	R. Thoren / R. Thoren	8-24-00 0900
R. Thoren / R. Thoren	8-24-00 1430	FedEx	
FedEx	8/25/00 0930	[signature]	8/25/00 0930

SPECIAL INSTRUCTIONS
** Samplers are to completely fill bottles for ICP Metals and Pu-Iso/U-Iso analyses to insure adequate volume is collected.
** If Am-241 or Total Hg is requested, combine with the Pu-Iso/U-Iso and ICP Metals analyses respectively.

ZT 8-24-00
~~(1) ICP Metals - 6010A (Supertrace) {Arsenic, Chromium, Lead}; Mercury - 7471 - (GV)~~
(2) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/98)

8125 9547 0360 Temp 6.2

OCT 31 '00 03:16PM BHI S&D MANAGEMENT 509 372 9487 P.10/21

Appendix 5

Data Validation Supporting Documentation

PESTICIDE/PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 1601+ 116-H-7			DATA PACKAGE: H0988		
VALIDATOR: JLI		LAB: Reeks		DATE: 11/20/00	
CASE:			SDG: H0988		
ANALYSES PERFORMED					
☐ CLP3/90	☐ SW-846 8080	☐ SW-846 8081	☒ 8082	☐	☐
SAMPLES/MATRIX B101W6 B101W7 B101W8 B101W9					
B101X0 B101X1 B101X2 B101X3 B101X4					
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments: _____

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . (Yes) No N/A

Comments: _____

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

3.1 INSTRUMENT PERFORMANCE (METHOD 8080 AND 8081)

Are DDT retention times acceptable . . . . . Yes No (N/A)

Are calibration standard retention times acceptable? . . . . . Yes No (N/A)

Are DDT and endrin breakdowns acceptable? . . . . . Yes No (N/A)

PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are DBC retention times acceptable? . . . . . Yes No N/A
Is the GC/MS tuning/performance check acceptable? . . . . . Yes No N/A
Comments:

3.2 CALIBRATIONS (METHOD 8080 AND 8081)

Are EVAL standard calibration factors and %RSD values acceptable? . . . . . Yes No N/A
Are quantitation column calibration factor %RSD values acceptable? . . . . . Yes No N/A
Were the analytical sequence requirements met? . . . . . Yes No N/A
Are continuing calibration %D values acceptable? . . . . . Yes No N/A
Comments:

3.3 INSTRUMENT PERFORMANCE AND INITIAL CALIBRATION (3/90 SOW)

Was the initial calibration sequence performed? . . . . . Yes No N/A
Was the resolution acceptable in the resolution check mix? . . Yes No N/A
Is resolution acceptable in the PEM, INDA and INDB? . . . . . Yes No N/A
Are DDT and Endrin breakdowns acceptable? . . . . . Yes No N/A
Are retention times in PEMs and calibration mixes acceptable? . Yes No N/A
Are RPD values in the PEMs acceptable? . . . . . Yes No N/A
Are %RSD values acceptable? . . . . . Yes No N/A
Comments:

3.4 CALIBRATION VERIFICATION (3/90 SOW)

Were the analytical sequence requirements met? . . . . . Yes No N/A
Is resolution acceptable in the PEMs? . . . . . Yes No N/A
Are initial calibrations acceptable? . . . . . Yes No N/A

A-6

PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are retention times acceptable in the PEMs, INDA and INDB mixes?	Yes	No	N/A
Are RPD values in the PEMs acceptable?	Yes	No	N/A
Are the DDT and endrin breakdowns acceptable?	Yes	No	N/A
Was GPC cleanup performed?	Yes	No	N/A
Is the GPC calibration check acceptable?	Yes	No	N/A
Was Florisil cleanup performed?	Yes	No	N/A
Is the Florisil performance check acceptable?	Yes	No	N/A

Comments:

4. BLANKS

Were laboratory blanks analyzed?	Yes	No	N/A
Are laboratory blank results acceptable?	Yes	No	N/A
Were field/trip blanks analyzed?	Yes	No	N/A
Are field/trip blank results acceptable?	Yes	No	N/A

Comments: No Field blank

5. ACCURACY

Were surrogates analyzed?	Yes	No	N/A
Are surrogate recoveries acceptable?	Yes	No	N/A
Were MS/MSD samples analyzed?	Yes	No	N/A
Are MS/MSD results acceptable?	Yes	No	N/A
Were LCS samples analyzed?	Yes	No	N/A
Are LCS results acceptable?	Yes	No	N/A

Comments: Surrogate X2 - 177% Jall
X3 - 123% J 124%
MS - J all but X0 (68%)

PESTICIDE/PCB DATA VALIDATION CHECKLIST

6. PRECISION

Are MS/MSD RPD values acceptable? . . . . . (Yes) No N/A
Are laboratory duplicate results acceptable? . . . . . Yes No (N/A)
Are field duplicate RPD values acceptable? . . . . . (Yes) No N/A
Are field split RPD values acceptable? . . . . . Yes No (N/A)
Comments: XO/W9 - FD

7. SYSTEM PERFORMANCE

Is chromatographic performance acceptable? . . . . . Yes No (N/A)
Are positive results resolved acceptably? . . . . . Yes No (N/A)
Comments:

8. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . Yes No (N/A)
Is compound quantitation acceptable? . . . . . Yes No (N/A)
Comments:

9. REPORTED RESULTS AND QUANTITATION LIMITS

Are results reported for all requested analyses? . . . . . (Yes) No N/A
Are all results supported in the raw data? . . . . . Yes No (N/A)
Do results meet the CRQLs? . . . . . Yes (No) N/A
Comments: No - all aroclor 1221 nondetects are

Appendix 6

Additional Documentation Requested by Client

Recra LabNet - Lionville Laboratory
PCB ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-042

DATE RECEIVED: 08/25/00 RFW LOT # :0008L362

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B101W6	001	S	00LE1056	08/23/00	08/29/00	09/14/00
B101W7	002	S	00LE1056	08/23/00	08/29/00	09/15/00
B101W7	002 MS	S	00LE1056	08/23/00	08/29/00	09/20/00
B101W7	002 MSD	S	00LE1056	08/23/00	08/29/00	09/20/00
B101W8	003	S	00LE1056	08/23/00	08/29/00	09/20/00
B101W9	004	S	00LE1056	08/23/00	08/29/00	09/15/00
B101X1	005	S	00LE1056	08/23/00	08/29/00	09/15/00
B101X2	006	S	00LE1056	08/23/00	08/29/00	09/20/00
B101X3	007	S	00LE1056	08/23/00	08/29/00	09/15/00
B101X4	008	S	00LE1056	08/23/00	08/29/00	09/20/00
LAB QC:						
PBLKYG	MB1	S	00LE1056	N/A	08/29/00	09/14/00
PBLKYG	MB1 BS	S	00LE1056	N/A	08/29/00	09/14/00

9/12/00

Recra LabNet - Lionville Laboratory
PCB ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-042

DATE RECEIVED: 09/01/00 RFW LOT # :0009L459

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B101X0	001	S	00LE1088	08/23/00	09/05/00	09/29/00
B101X0	001 MS	S	00LE1088	08/23/00	09/05/00	09/29/00
B101X0	001 MSD	S	00LE1088	08/23/00	09/05/00	09/29/00
LAB QC:						
PBLKYS	MB1	S	00LE1088	N/A	09/05/00	09/29/00
PBLKYS	MB1 BS	S	00LE1088	N/A	09/05/00	09/29/00

10-1SW

Date: 21 November 2000
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100H Areas - Full Protocol - Waste Site 116-H-7 Overburden
Subject: Inorganics - Data Package No. H0988-RLN (SDG No. H0988)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H0988-RLN prepared by RECRA LabNet (RLN). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B101W6	8/23/00	Soil	C	See note 1
B101W7	8/23/00	Soil	C	See note 1
B101W8	8/23/00	Soil	C	See note 1
B101W9	8/23/00	Soil	C	See note 1
B101X0	8/23/00	Soil	C	See note 1
B101X1	8/23/00	Soil	C	See note 1
B101X2	8/23/00	Soil	C	See note 1
B101X3	8/23/00	Soil	C	See note 1
B101X4	8/23/00	Soil	C	See note 1

1 - Chromium VI by 7196A; ICP metals by 6010B (arsenic, chromium and lead); mercury by7471A.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL May 1998). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times**

  Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 6 months for ICP metals; 30 days for chromium VI; and 28 days for mercury.

  Due to the holding time being exceeded by less than twice the limit, the chromium VI result in sample B101X0 was qualified as an estimate and flagged "J".

  All other holding times were acceptable.

- **Preparation (Method) Blanks**

  Preparation Blanks

  At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

  In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

  All preparation blank results were acceptable although the target detection limit (TDL) was exceeded for chromium VI.

  Field Blank

  No field blanks were submitted with the sample data group (SDG), therefore, no field blank data was present for review.

- **Accuracy**

  Matrix Spike

  Matrix spike (MS) analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 70% to 130%. Samples with a spike recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

  All matrix spike recovery results were acceptable.

- **Precision**

  Laboratory Duplicate Samples

  Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

  All laboratory duplicate results were acceptable.

  Field Duplicate

  One set of field duplicate samples were submitted for analysis (B101W9/B101X0). The RPD for ICP chromium (36%) and lead (39%) were outside the required parameters. Under the BHI statement of work, no qualification is required.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 Area Remedial Action Sampling and Analysis Plan TDLs to ensure that laboratory detection levels

meet the required criteria. The TDL was exceeded for chromium VI in all undetected samples. Under the BHI statement of work, no qualification is required.

- **Completeness**

Data package No. H0988-RLN (SDG No. H0988) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the holding time being exceeded by less than twice the limit, the chromium VI result in sample B101X0 was qualified as an estimate and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The TDL was exceeded for chromium VI in all undetected samples. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 1, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, May 1998.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H0988	REVIEWER: TLI	DATE: 11/21/00	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Chromium VI	J	B101X0	Holding time exceeded

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFORD																					
Laboratory: RECRA LabNet																					
Case	SDG: H0988																				
Sample Number		B101W6		B101W7		B101W8		B101W9		B101X0		B101X1		B101X2		B101X3		B101X4			
Remarks										Duplicate											
Sample Date		8/23/00		8/23/00		8/23/00		8/23/00		8/23/00		8/23/00		8/23/00		8/23/00		8/23/00			
Inorganics	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q		
Chromium VI	0.1	0.40	U	0.40	U	0.40	U	0.40	U	0.40	UJ	0.40	U	0.59		0.40	U	0.40	U		
Arsenic	51.05	3.0		2.9		2.3		2.5		2.1		5.0		4.4		3.7		4.3			
Chromium (total)	0.5	10.7		10.2		10.7		9.8		6.8		10.8		11.4		10.8		11.2			
Mercury	0.05	0.02	U	0.02	U	0.02	U	0.02	U	0.01	U	0.02	U	0.02	U	0.02	U	0.02	U		
Lead	2	5.4		5.0		4.0		5.2		3.6		12.9		11.0		8.3		9.3			

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 09/21/00

CLIENT: BHI-HANFORD 309-042 RECRA LOT #: 0009L362

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B101W6	Arsenic, Total	3.0	MG/KG	0.32	1.0
		Chromium, Total	10.7	MG/KG	0.08	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	5.4	MG/KG	0.20	1.0
-002	B101W7	Arsenic, Total	2.9	MG/KG	0.31	1.0
		Chromium, Total	16.1	MG/KG	0.08	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	8.0	MG/KG	0.19	1.0
-003	B101W8	Arsenic, Total	2.3	MG/KG	0.31	1.0
		Chromium, Total	16.7	MG/KG	0.08	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	4.8	MG/KG	0.19	1.0
-004	B101W9	Arsenic, Total	3.8	MG/KG	0.31	1.0
		Chromium, Total	9.8	MG/KG	0.07	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	5.2	MG/KG	0.19	1.0
-005	B101X1	Arsenic, Total	5.0	MG/KG	0.31	1.0
		Chromium, Total	10.8	MG/KG	0.08	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	12.9	MG/KG	0.18	1.0

JK 11/21/00

Received: 31.Oct.00 05:38 PM From: UnknownSender To: 2087238944 Powered by Fax.com Page: 6 of 27
OCT 31 '00 03:33PM BHI S&D MANAGEMENT 509 372 9487 P.6/27

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 09/21/00

CLIENT: TMU-HANFORD B99-042 RECRA LOT #: 0009L362

WORK ORDER: 10905-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-005	B101X2	Arsenic, Total	4.4	MG/KG	0.29	1.0
		Chromium, Total	11.4	MG/KG	0.08	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	11.8	MG/KG	0.18	1.0
-007	B101X3	Arsenic, Total	3.7	MG/KG	0.31	1.0
		Chromium, Total	10.8	MG/KG	0.08	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	8.3	MG/KG	0.20	1.0
-008	B101X4	Arsenic, Total	4.3	MG/KG	0.32	1.0
		Chromium, Total	11.2	MG/KG	0.09	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	9.3	MG/KG	0.20	1.0

11/21/00

-065

000012

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 10/12/00

CLIENT: TNU-HANFORD B99-042 RECRA LOT #: 00091459

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B101X0	Arsenic, Total	2.1	MG/KG	0.32	1.0
		Chromium, Total	6.8	MG/KG	0.08	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Lead, Total	3.5	MG/KG	0.20	1.0

000012A

JWD 1/2/01

07

05

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 09/21/00

CLIENT: TMU-HANFORD B99-042 RECRA LOT #: 0008L362
WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B101W6	% Solids	99.7	%	0.01	1.0
		Chromium VI	0.40 u	MG/KG	0.40	1.0
-002	B101W7	% Solids	99.9	%	0.01	1.0
		Chromium VI	0.40 u	MG/KG	0.40	1.0
-003	B101W8	% Solids	99.9	%	0.01	1.0
		Chromium VI	0.40 u	MG/KG	0.40	1.0
-004	B101W9	% Solids	99.9	%	0.01	1.0
		Chromium VI	0.40 u	MG/KG	0.40	1.0
-005	B101X1	% Solids	99.7	%	0.01	1.0
		Chromium VI	0.40 u	MG/KG	0.40	1.0
-006	B101X2	% Solids	99.6	%	0.01	1.0
		Chromium VI	0.58	MG/KG	0.40	1.0
-007	B101X3	% Solids	99.8	%	0.01	1.0
		Chromium VI	0.40 u	MG/KG	0.40	1.0
-008	B101X4	% Solids	99.6	%	0.01	1.0
		Chromium VI	0.40 u	MG/KG	0.40	1.0

11/20/00

04

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 09/28/00

CLIENT: TNU-HANFORD B99-042 RECRA LOT #: 0009L459
WORK ORDER: 10395-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B101X0	% Solids	99.9	%	0.01	1.0
		Chromium VI	0.40 u J	MG/KG	0.40	1.0

11/20/00

08

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA ENVIRONMENTAL INC.
Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU-HANFORD B99-042
RFW#: 0008L362/0008L459
SDG/SAF#: H0988/B99-042

W.O.#: 10985-001-001-9999-00
Date Received: 08-25-00 and 09-01-00

METALS CASE NARRATIVE

1. This narrative covers the analyses of 9 soils samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.

3. All analyses were performed within the required holding times.

4. All cooler temperatures have been recorded on the Chain of Custodies.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the laboratory control limits. Refer to the Inorganics Laboratory Control Standards Report.

10. All matrix spike (MS) recoveries were within the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

12. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

13. I certify thar this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Rclease of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

10-12-00
Date

pcfhw08-362

RECRA ENVIRONMENTAL INC.
Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

10/30/00

Client : TNU-HANFORD B00-042 B99-042 **W.O. # : 10985-001-001-9999-00**
RFW# : 0008L362 and 0009L459 **Date Received: 08-25-00;09-01-00**
SDG# : H0988
SAF# : B00-042 B99-042
10/30/00

INORGANIC CASE NARRATIVE

1. This narrative covers the analyses of 9 soil samples.
2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary.
3. Sample holding times as required by the method and/or contract were met.
4. The cooler temperatures were recorded on the chain-of-custody.
5. The method blanks for Chromium VI were within method criteria.
6. The Laboratory Control Samples (LCS) for Chromium VI were within the laboratory control limits.
7. The matrix spike recoveries for Chromium VI were within the 75-125% control limits.
8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit.
9. Results for solid samples are reported on a dry weight basis.
10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

10-2-00

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

rlp\004-362;09-439

0018-362

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-042-92	Page 1 of 1
Collector: Johnson/Burchler	Company Contact: Mike Stankovich; Telephone No. 531-7620; Project Coordinator: TRENT, SJ	Price Code 8L	Data Turnaround: 21 Days
Project Designation: 100 H Area - Full Protocol	Sampling Location: 100H-7 Overburden; SAF No. B99-042	Air Quality ☐	
Ice Chest No. IAJ ~~SMK 519~~ (3)	Field Logbook No. EL-1500-3; COA R1169172600	Method of Shipment: Federal Express	CHEM SOW H0988
Shipped To: TMA/RECRA RECRA	Offsite Property No. HMSR G00832	Bill of Lading/Air Bill No. N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS: PCB's - process knowledge & Data review indicate PCB Content <50 ppm

Special Handling and/or Storage:

Preservation	~~None~~	~~None~~	Cool 4C	Cool 4C	None	~~None~~					
Type of Container	~~aG~~	~~aG~~	aG	aG	aG	~~P~~					
No. of Container(s)	~~1~~	~~1~~	1	1	1	~~2~~					
Volume	~~[illegible]~~	~~[illegible]~~	125mL	250mL	250mL	~~500mL~~					
SAMPLE ANALYSIS	~~[illegible]~~	~~[illegible]~~	Chromium Hex - 7196	PCBs - 8082	See item (1) in Special Instructions.	~~See item (2) in Special Instructions.~~				Tie To	

Sample No.	Matrix *	Sample Date	Sample Time										
001 B101W6	SOIL	08-23-00	0830			X	X	X				BOX	K39
002 B101W7	SOIL	08-23-00	0840			X	X	X					
003 B101W8	SOIL	08-23-00	0904			X	X	X					
004 B101W9	SOIL	08-23-00	0919			X	X	X					
B101X0	SOIL	08-23-00	0919			X	X	X					

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
[illegible] 8-23-00	1025	R. Thoren / R. Thoren 8-23-00	1025
R. Thoren / R. Thoren 8-23-00	1600	Stored ch RS 1R 3728 8-23-00	1600
Removed from RS 1R 3728 8-24-00	0900	R. Thoren 8-24-00	0900
R. Thoren / R. Thoren 8-24-00	1430	FEDEX	
FEDEX	8/25/00 0930	[signature] 8/25/00	0930

SPECIAL INSTRUCTIONS
** Samplers are to completely fill bottles for ICP Metals and Pu-Iso/U-Iso analyses to insure adequate volume is collected.
** If Am-241 or Total Hg is requested, combine with the Pu-Iso/U-Iso and ICP Metals analyses respectively.
RT 8-24-00
~~(1) ICP Metals - 6010A [illegible]~~
(2) Gamma Spectroscopy [Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]

Matrix *: S=Soil, SE=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/98)

8125 9547 0360 Temp 6.2

OCT 31 '00 03:19PM BHI S&D MANAGEMENT 509 372 9487 P.18/21

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B99-042-92	Page 1 of 3
Collector: Johnston/Buechler	Company Contact: Mike Stankovich; Telephone No. 531-7620	Project Coordinator: TRENT, SJ	Price Code 8L	Data Turnaround 21 Days
Project Designation: 100 H Area - Full Protocol	Sampling Location: 1607-7 Overburden	SAF No. B99-042	Air Quality ☐	
Ice Chest No. 1A2 (2)	Field Logbook No. EL-1500-1; COA K116H72600	Method of Shipment: Federal Express	CHEM S06 110985	
Shipped To: TMA/RECRA RECRA	Offsite Property No. HMSF 000833	Bill of Lading/Air Bill No. N/A		

POSSIBLE SAMPLE HAZARDS/REMARKS: PCB'S - Data review & process knowledge indicate PCB content <50ppm

Special Handling and/or Storage:

Preservation	None	None	Cool 4C	Cool 4C	None	None					
Type of Container	aG	aG	aG	aG	aG	P					
No. of Container(s)	1	1 0	1	1	1	2 0					
Volume	60mL	60mL	125mL	250mL	250mL	500mL					
SAMPLE ANALYSIS	[illegible]	[illegible]	Chromium Hex - 7196	PCBs - 8082	See item (1) in Special Instructions	See item (2) in Special Instructions					

Sample No.	Matrix *	Sample Date	Sample Time	[redacted]								
B101X1	SOIL	8-23-00	0945			X	X	X				
B101X2	SOIL	8-23-00	1005			X	X	X				
B101X3	SOIL	8-23-00	1022			X	X	X				
B101X4	SOIL	8-23-00	1048			X	X	X				

Handwritten beside the column heads: Tij To; beside B101X1: BOX K34

Handwritten beside sample rows: 005, 006, 007, 008

CHAIN OF POSSESSION	Date/Time	Sign/Print Names	Date/Time
Relinquished By: [signature]	8-23-00 1500	Received By: R. Thoren	8-23-00 1500
Relinquished By: R. Thoren	8-23-00 1600	Received By: Storage in Ref. 1B	8-23-00 1600
Relinquished By: Removed from Ref. 1B	8-24-00 0700	Received By: R. Thoren	8-24-00 0700
Relinquished By: R. Thoren FedEx	8-24-00 1430	Received By: FedEx	
Relinquished By: FedEx	8/25/00 0930	Received By: [signature]	8/25/00 0930
Relinquished By:		Received By:	

SPECIAL INSTRUCTIONS
** Samples are to completely fill bottles for ICP Metals and Pu-Iso/U-Iso analyses to insure adequate volume is collected.
** If Am-241 or Total Hg is requested, combine with the Pu-Iso/U-Iso and ICP Metals analyses respectively.
(1) ICP Metals - 6010A (Supertrace) (Arsenic, Chromium, Lead); Mercury - 7471 - (CV)
(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)

Matrix *: S=Soil, SE=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/98)

3305081032 Temp 5.9

000030

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 116-H-7			DATA PACKAGE: H0988		
VALIDATOR: TLI		LAB: Recra		DATE: 11/17/06	
CASE:			SDG: H0988		
ANALYSES PERFORMED					
☐ CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	☐	☐
☒ SW-846/ICP	☐ SW-846/GFAA	☒ SW-846/Hg	☐ SW-846 Cyanide	☒ CR	☐
SAMPLES/MATRIX	B101W6	B101W7	B101W8	B101W9	
	B101X0	B101X1	B101X2	B101X3	
	B101X4				
				Sal	

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments: _____

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . Yes (No) N/A

Comments: CRDL X0 - own J

AE

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

Were initial calibrations performed on all instruments?	Yes	No	N/A
Are initial calibrations acceptable?	Yes	No	N/A
Are ICP interference checks acceptable?	Yes	No	N/A
Were ICV and CCV checks performed on all instruments?	Yes	No	N/A
Are ICV and CCV checks acceptable?	Yes	No	N/A

Comments:

4. BLANKS

Were ICB and CCB checks performed for all applicable analyses?	Yes	No	N/A
Are ICB and CCB results acceptable?	Yes	No	N/A
Were preparation blanks analyzed?	Yes	No	N/A
Are preparation blank results acceptable?	Yes	No	N/A
Were field/trip blanks analyzed?	Yes	No	N/A
Are field/trip blank results acceptable?	Yes	No	N/A

Comments: NO FB pb det but all < 5x

5. ACCURACY

Were spike samples analyzed?	Yes	No	N/A
Are spike sample recoveries acceptable?	Yes	No	N/A
Were laboratory control samples (LCS) analyzed?	Yes	No	N/A
Are LCS recoveries acceptable?	Yes	No	N/A

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

Were laboratory duplicates analyzed?	Yes	No	N/A
Are laboratory duplicate samples RPD values acceptable?	Yes	No	N/A
Were ICP serial dilution samples analyzed?	Yes	No	N/A
Are ICP serial dilution %D values acceptable?	Yes	No	N/A
Are field duplicate RPD values acceptable?	Yes	No	N/A
Are field split RPD values acceptable?	Yes	No	N/A

Comments: CK (tons) lead over (See narrative)

7. FURNACE AA QUALITY CONTROL

Were duplicate injections performed as required?	Yes	No	N/A
Are duplicate injection %RSD values acceptable?	Yes	No	N/A
Were analytical spikes performed as required?	Yes	No	N/A
Are analytical spike recoveries acceptable?	Yes	No	N/A
Was MSA performed as required?	Yes	No	N/A
Are MSA results acceptable?	Yes	No	N/A

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses?	Yes	No	N/A
Are all results supported in the raw data?	Yes	No	N/A
Are results calculated properly?	Yes	No	N/A
Do results meet the CRDLs?	Yes	No	N/A

Comments: CRDF U's

Appendix 6

Additional Documentation Requested by Client

Severn LabTest - Lionville

INORGANICS PRECISION REPORT 05/11/00

CLIENT: INV-HANFORD B99-042 SEVERN LOT #: 0005L363
WORK ORDER: 10968-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE RESULT	RPD	DILUTION FACTOR (DF)
-001KDP	B101W6	Arsenic, Total	2.8	2.6	14.3	1.0
		Chromium, Total	10.7	10.8	0.93	1.0
		Mercury, Total	0.02%	0.02%	NC	1.0
		Lead, Total	5.4	5.3	1.9	1.0

12

Severn LabMat - Lionville

INORGANICS ACCURACY REPORT 09/21/00

CLIENT: TWC-HANFORD 899-042 SEVERN LOG #: 0008L362
WORK ORDER: 10985-001-001-0000-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-001	S102W6	Arsenic, Total	172	3.6	168	91.2	1.0
		Chromium, Total	28.3	10.7	16.8	96.8	1.0
		Mercury, Total	0.18	0.02u	0.17	105.4	1.0
		Lead, Total	47.1	5.6	46.4	89.9	1.0

10

Received: 31.Oct.00 05:38 PM From: UnknownSender To: 2087238944

OCT 31 '00 03:34PM BHI S&D MANAGEMENT 509 372 9487

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 09/21/00

CLIENT: THU-HANFORD 899-042 RECRA LOT #: 000L362
WORK ORDER: 10385-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	99L1554-MB1	Arsenic, Total	0.34 u	MG/KG	0.34	1.0
		Chromium, Total	0.09 u	MG/KG	0.09	1.0
		Lead, Total	0.22	MG/KG	0.21	1.0
BLANK1	00C0196-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

08

Recra LabNet - Liquville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 09/21/00

CLIENT: TNC-HANFORD 899-042 RECRA LOT #: 0009L362
WORK ORDER: 10945-001-001-0999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	00LVIA69-MB1	Chromium VI	0.40 U	MG/KG	0.40	1.0

Severn Labs - Lionville

INORGANICS ACCURACY REPORT 09/21/00

CLIENT: TWU-HANFORD 899-042 SEVERN LOT #: 0009L262

WORK ORDER: 10995-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-001	B101W6	Soluble Chromium VI	3.7	0.40U	4.0	92.5	1.0
		Insoluble Chromium VI	942	0.40U	1160	81.2	100
BLANK10	00LVIA49-MB1	Soluble Chromium VI	4.0	0.40U	4.0	100.3	1.0
		Insoluble Chromium VI	1230	0.40U	1180	103.8	100

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 09/21/00

CLIENT: BWI-HANFORD E99-042 RECRA LOT #: 0008L362
WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR (REP)
-001REP	S102W6	% Solids	99.7	99.7	0.00	1.0
		Chromium VI	0.40u	0.40u	NC	1.0

Severn Laboratories - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 09/26/00

CLIENT: TMU-HANFORD B99-042 RECRA LOT #: 00091469
WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	00LVI051-MB1	Chromium VI	0.40 U	MG/KG	0.40	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 09/28/00

CLIENT: TWU-HANFORD B99-042 RECRA LOT #: 0009L459
WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-0C1	B101X0	Soluble Chromium VI	4.8	0.40 U	4.0	111.8	1.0
		Insoluble Chromium VI	1160	0.40 U	1220	94.5	100
SLANK10	00LVI051-MS1	Soluble Chromium VI	4.2	0.40%	4.0	104.0	1.0
		Insoluble Chromium VI	1150	0.40%	1160	98.9	100

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 09/28/00

CLIENT: DOE-HANFORD 899-042 RECRA LOT #: 0009L459

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE RESULT	RPD	DILUTION FACTOR (REP)
-001RE9	B101X0	% Solids	99.9	99.7	0.32	1.0
		Chromium VI	0.40u	0.43	NC	1.0

Duncan, Jeanette M

From: Weiss, Richard L
Sent: Monday, November 27, 2000 4:34 PM
To: Duncan, Jeanette M
Subject: Review of Validation Package for SDG H0988

Jeanette,

The following are my comments on the validation packages for SDG H0988:

Radiochemistry - pg. 3 & pg. 4: The TDL for Eu-155 was missed for all samples. Delete "except B101X2".

Inorganics - pg. 1: Project is incorrect. Change to "100H Areas...".

PCB - pg. 1: Project and Waste Site is incorrect. Change to "100H Areas - Full Protocol - Waste Site 116-H7 Overburden".

Need to add an additional page to appendix B - include page 8 from the original data package to show prep/analysis dates for sample B101X0.

Rich

changes properly incorporated

RLWeiss 01/02/01

Review Comment Record (RCR)

1. Date	2. Review No.
12/05/00	QA-0050
3. Project	4. Page
100-H	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No. H988	100-H Areas - Full Protocol, Waste Sites 116-H-7 Overburden	Claude Stacey	Quality Program	372-9208

17. Comment Submittal Approval:

Organization Manager (Optional) / Date

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact / Date

Author/Originator

11. CLOSED

Reviewer/Point of Contact / Date: 01/02/01

Author/Originator

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Radiochemistry: Page 003, Detection Limits and Page 004 Minor Deficiencies states "uranium-155 in all samples except B101X2." This should read "Europium-155 in all samples."			
2	Inorganic: The laboratory data sheet for sample B101X0 6010B metals and Hg is missing from the report.			
3	PCB: OK No Comments			
4				
5				